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Oil/water emulsions can be stabilized by colloids as clays. However, the clay surface usually has to be modified by surface active agents (mostly organic cations) in order to obtain an emulsion that shows long term stability. Oil/water emulsions stabilized only by sodium montmorillonite clay and Ca/Al layered double hydroxide (LDH) without any surfactants have been imaged both near the carbon and calcium x-ray absorption edges in order to better understand the stabilization mechanism and map the structure of the heterocoagulates (formed by positively charged LDH and negatively charged clay). Figure 1 shows spectra of Ca/Al-LDH near the calcium edge and paraffin oil near the carbon edge, as well as photon energies chosen for the images of figure 2. Oil can be distinguished from water near the carbon edge, and double hydroxides from clay near the calcium edge, by taking differential absorption images with the X1-A scanning transmission x-ray microscope (STXM) at either side of the respective edge (see figure 2). Avoiding surface active agents is desirable from an environmental and toxicological point of view and this new type of emulsion is of interest for applications in cosmetical and pharmaceutical products. This work was supported by a fellowship from German Academic Exchange Service (DAAD), by the Office of Biological and Environmental Research, U.S. DoE under contract DE-FG02-89ER60858 and by a travel grant from Boehringer Ingelheim Fond for basic medical research. We would like to thank Sue Wirick for her support at the beamline.

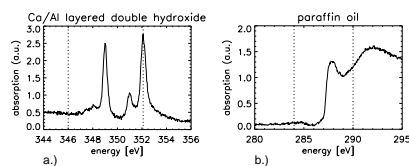


Figure 1. XANES-Spectra, taken in the X1-A STXM. a.) Spectrum of Ca/Al layered double hydroxide, taken near calcium edge. b.) Spektrum of paraffin oil near carbon edge. Photon energies, that have been used for images shown in figure 2 are marked with dashed lines.

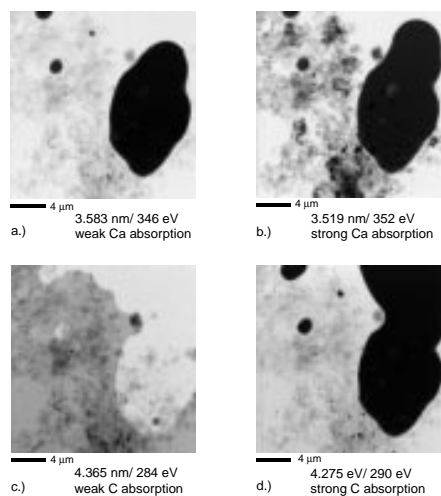


Figure 2. STXM-images of an oil/water emulsion stabilized by colloids near calcium and carbon absorption edge.